

CLEAN VERSION OF CLAIMS

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1. A computer network for managing operations within a feedlot having a plurality of animal pens each having a feedbunk, said computer network comprising:

a feedbunk reading computer system, associated with a feedbunk reading vehicle transportable to animal pens in said feedlot, said feedbunk reading computer system including mechanisms for receiving, storing and displaying animal health data and feed ration dispensed data;

the feedbunk reading computer system further including mechanisms for producing, storing and displaying feed ration delivery data, said feed ration delivery data specifying the assigned amount of feed ration to be delivered to the feedbunks associated with a plurality of animal pens along a feeding route within a predetermined time period, and said feed ration dispensed data indicating the actual amount of feed ration delivered to the feedbunks of said animal pens during the predetermined time period;

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a plurality of feed delivery vehicles each being associated with a feed delivery vehicle computer system transportable to each said animal pen in said feedlot and having a storage mechanism for storing an assigned feed load, and a feed metering mechanism for measuring the actual amount of feed ration delivered to the feedbunks associated with said feeding route, and a data generation mechanism for producing said feed ration dispensed data indicative of the actual amount of feed ration delivered to said feedbunks, each said feed delivery vehicle computer system having mechanisms for receiving, storing and displaying said feed ration delivery data provided from said feedbunk reading computer system and a mechanism for receiving said feed ration dispensed data produced from said metering mechanism aboard said feed delivery vehicle;

a feedmill computer system, installed at a feedmill in said feedlot and having mechanisms for receiving, storing and displaying said feed ration delivery data produced from said feedbunk reading computer system;

a feedlot management computer system for receiving, storing and displaying said feed ration delivery data, said feed ration dispensed data and said animal health data, for use by a feedlot manager of said feedlot;

a digital data communications system integrated with said feedlot computer network, for transferring digital data files among said feedbunk reading computer system, said feedmill computer system, said plurality of feed delivery vehicle computer systems, said feedlot management computer system and said feedmill computer system, wherein

said digital data files include any of said feed ration deliver data, said animal health data and said feed ration dispensed data; and

a database for maintaining information representative of a model of said feedlot and objects contained therein, each said feed delivery computer system including a mechanism for viewing at least a portion of said model maintained in said database, each feed delivery computer system also including a vehicle information acquisition mechanism for acquiring vehicle information regarding (i) the position of said feed delivery vehicle relative to a first prespecified coordinate referenced frame, and/or (ii) the state of operation of said feed delivery vehicle and information to said database to specify in the position and/or the state of operation of said feed delivery vehicle represented within said model of said feedlot.

2. The computer network of claim 1, wherein said vehicle information acquisition mechanism comprises a satellite-based global positioning system, and said database is repeatedly updated using said vehicle information obtained from said satellite-based global positioning system.

3. The computer network of claim 2, further comprising an animal information acquisition mechanism for acquiring animal information regarding at least one of: (a) the position of animals in said feedlot relative to said prespecified coordinate reference frame, and (b) the body-temperature of said animals, such that said feedlot model reflects at least one of the position and body-temperature of said animals.

4. The computer network of claim 1, wherein said feed delivery vehicle computer system is coupled to a stereoscopic display subsystem which permits the driver to stereoscopically view any aspect of said model, including the driver's vehicle as it is being navigated through the feedlot during feedlot operations.

5. The computer network of claim 4, wherein each said feed delivery vehicle is remotely controlled through the feedlot by an operator using a remotely situated workstation.

6. The computer network of claim 5, wherein each said feed delivery vehicle is equipped with a stereoscopic vision subsystem having a field of view along the navigational course of said feedlot vehicle.
7. The computer network of claim 6, wherein said database is maintained aboard an Internet server operably associated with an Internet-based digital communications network.
8. The computer network of claim 6, wherein a replica of said database is maintained aboard each said feedlot vehicle computer system.
9. The computer network of claim 3, wherein the feedlot vehicle computer system further comprises a data retrieval mechanism for ascertaining both vehicle and animal information reflected in said model of the feedlot.
10. The computer network of claim 1, which further comprises at least one workstation for viewing said model of said feedlot during feedlot operations.
11. The computer network of claim 1, which further comprises at least one workstation for viewing said model of a feedlot vehicle in said feedlot and remotely navigating said feedlot vehicle along a course in said feedlot.
12. An animal feedlot management system, comprising:  
a plurality of feedlot vehicle computer systems which each include:  
a communications mechanism for communicating with a feedlot computer network comprised of a feedbunk reading computer system, a means for producing, storing and displaying feed ration delivery data, a feedmill computer system, and a feedlot management computer system,  
a feedlot modeling mechanism for maintaining a geometrical database containing a geometrical model of the feedlot and objects contained therein a coordinate acquisition mechanism for acquiring coordinate information specifying the position of the feedlot vehicle relative to a reference coordinate system defined within the feedlot, and  
a geometrical database processor for processing information in said geometrical

database using said coordinate information in order to update said geometrical model.

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13. A computer-implemented method of animal feedlot management, the method comprising the steps of:

- (a) providing a feedlot computer network comprised of a feedbunk reading computer system, a means for producing, storing and displaying feed ration deliver data, a feedmill computer system, and a feedlot management computer system,
  - (b) providing a feedlot vehicle associated with a portable computer system in communication with said feedlot computer network, said portable computer system using real-time VR modeling and coordinate acquisition techniques in order to maintain a 3-D geometrical model of said feedlot and objects therein including said feedlot vehicle; and
  - (c) navigating said feedlot vehicle while viewing at least a portion of said feedlot model from within said feedlot vehicle.
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feedlot management system for installation in an animal feedlot, comprising the steps of providing a feedlot computer network comprised of a feed-bunk reading computer system, a means for producing, storing and displaying feed ration delivery data, a feedmill computer system, a feedlot management computer system, a digital data communications system integrated with the feedlot computer network; providing a feedlot vehicle with an on-board computer system in communication with the feedlot computer network, the onboard computer system using real-time VR modelling and coordinate acquisition techniques in order to maintain a 3-D geometrical model of the feedlot and objects therein including the feedlot vehicle; and navigating the feedlot vehicle while viewing an aspect of the feedlot model from within the feedlot vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic representation of a feedlot within which the feedlot computer network of the present invention is installed in order to practice the system and method of the present invention.

Figs. 2A1-1 and 2A1-2 together comprise a system block diagram of the illustrative embodiment of the feedlot computer network of the present invention, showing the 1<sup>st</sup> feed delivery computer system, the n<sup>th</sup> feed delivery computer system, the feedmill computer system, the feedlot management computer system, the feedbunk reading computer system, the veterinary computer system, the nutritionist reading computer system, the VR workstation for the veterinary vehicle, the VR workstation for

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bunk being uniformly filled with an assigned amount of feed ration.

Fig. 2B2' is a schematic representation of the  $n^{\text{th}}$  feed delivery vehicle of the present invention shown operating in its "unmanned navigation" mode of operation with a human operator sitting before its remote-situated VR workstation and remotely navigating the vehicle along a preplotted navigational course passing along a feedbunk being uniformly filled with an assigned amount of feed ration.

Fig. 2B3-1 and 2B3-2 together comprise a schematic system diagram of the computer system aboard the  $n^{\text{th}}$  feed delivery vehicle, showing the components used to realize the subsystems thereof.

Fig. 2B4 is a geometrical representation of a 3-D VR model of a portion of an animal feedlot (i.e. VR-based feedlot model), showing one of its pens, a feedbunk and a feed delivery vehicle, originally created in the centralized VR workstation and thereafter maintained and updated within each of the VR subsystems in the feedlot computer network.

Fig. 2B5 is a geometrical representation of a 3-D VR-based model of the  $n^{\text{th}}$  feed delivery vehicle, maintained within each VR subsystem of the first illustrative embodiment, in which a local coordinate reference system (i.e. coordinate reference frame) is symbolically embedded therein, and submodels of its front and rear GPS receivers are shown mounted along the centerline  $l_{FDV}(n)$  of the vehicle at endpoints  $P_{FDV1}(n)$  and  $P_{FDV2}(n)$ , respectively, and its feed delivery chute is shown pivotally mounted about a pivot point  $P_{FDV}(n)$  located along the vehicle's centerline  $l_{FDV}(n)$ .